

## ABSTRACT OF THE DISCLOSURE

A method for fabricating a substantially smooth-surfaced anti-reflective coating on a semiconductor device structure including generating a plasma from an inert gas in a process chamber in which the anti-reflective coating is to be deposited. The anti-reflective coating may include silicon, oxygen and nitrogen, and is preferably of the general formula  $\text{Si}_x\text{O}_y\text{N}_z$ , where  $x$  equals 0.40 to 0.65,  $y$  equals 0.02 to 0.56 and  $z$  equals 0.05 to 0.33. Preferably,  $x + y + z$  equals one. The method may also include fabricating a silicon nitride layer over the anti-reflective coating. A semiconductor device comprising a silicon nitride layer over the anti-reflective coating including at most about  $1\frac{1}{4}$  in-film particles per square millimeter of surface area particles or surface roughness features in the silicon nitride of about 120-150 nanometers. Accordingly, a mask that is subsequently formed over the silicon nitride layer has a substantially uniform thickness and is substantially distortion-free.